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3 **TITLE:** Surgical approach to a delayed presentation of gastro-colocutaneous fistula
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19 **Short Running Title:** Gastro-colocutaneous fistula following PEG

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22 submission.

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33 **TITLE:** Surgical approach to a delayed presentation of gastro-colocutaneous fistula
34 following percutaneous endoscopic gastrostomy

35

36 **ABSTRACT**

37

38 **Introduction**

39 Gastro-colocutaneous fistula is a rare complication of percutaneous endoscopic
40 gastrostomy tube placement that can present early at the time of insertion or late due
41 to misplacement of gastrostomy tube through colon. It is suspected if there is
42 profuse diarrhea after each tube feed, feculent drainage through or around the
43 gastrostomy tube

44

45 **Case Report**

46 We report a rare case of gastro-colocutaneous fistula after two years of
47 percutaneous gastrostomy tube insertion which was managed by surgical excision of
48 fistula.

49

50 **Conclusion**

51 Adherence to safety measures by the healthcare professionals at the time of
52 gastrostomy tube insertion helps in preventing gastro-colocutaneous fistula.

53

54 **Keywords:** Gastro-colocutaneous fistula, Percutaneous endoscopic gastrostomy,
55 Surgical approach

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64 **TITLE:** Surgical approach to a delayed presentation of gastro-colocutaneous fistula
65 following percutaneous endoscopic gastrostomy

66

67 **INTRODUCTION**

68 Percutaneous endoscopic gastrostomy (PEG) tube placement was first described by
69 Gaurderer et al in 1980 [1]. Since then PEG has become a safe, effective and well
70 accepted procedure for enteral nutrition in patients who cannot tolerate oral intake
71 for a prolonged period of time [1].

72 PEG, although a safe procedure, can be associated with variety of complications.
73 Minor complications include wound infection, bleeding, skin excoriation, leakage and
74 granulation tissue at the PEG site. Major complications include peritonitis, intestinal
75 obstruction, tube dislodgement and gastro enteric fistula formation [2]. Gastro-
76 colocutaneous (GCC) fistula is a rare complication of PEG insertion which can
77 present early or late due to misplacement of PEG tube through colon. We present a
78 rare case of GCC fistula after 2 years of PEG insertion.

79

80 **CASE REPORT**

81 An 81-year-old male, nursing home resident with multiple medical co-morbidities
82 underwent a PEG placement more than 2 years ago at an outside hospital for
83 dysphagia secondary to stroke. He was admitted under medical service for
84 pneumonia. He had no previous abdominal surgeries apart from PEG insertion.
85 After a few days of hospital admission, feculent material was observed around the
86 PEG tube and intermittent diarrhea with tube feeding. Clinical suspicion of a GCC
87 fistula was made. PEG feedings were held and total parenteral nutrition was initiated.
88 Gastrografen study via G-tube and barium enema failed to demonstrate the fistula.
89 Because of high clinical suspicion of GCC fistula, further imaging by Computerized
90 Tomography (CT) of the abdomen with contrast via PEG tube was done. It raised the
91 possibility of GCC fistula since the majority of contrast was seen in the large bowel
92 with little contrast in the small bowel (Figure 1). Since he continued to drain feculent
93 material, a decision was made to perform open surgical exploration. Intraoperatively,
94 we identified the G-tube passing through the colon and into the stomach. He
95 underwent stapled excision of gastro-colic fistula with reinforcement of the staple line

96 with 3-0 polysorb (Figure 2 A and B). The anterior colonic opening was closed with
97 the same 3-0 polysorb and the fistula tract was excised (Figure 2 C). A new
98 gastrostomy tube was placed away from the stapled site on the stomach. The fascia
99 was closed and skin was approximated loosely in view of high risk of infection. The
100 patient did well following surgery and tolerated tube feeds without any further
101 complications.

102

103 **DISCUSSION**

104 The incidence of GCC fistula following PEG insertion is 0.5% in adults and 2-3 %
105 pediatric population [3]. Although the exact mechanism for GCC fistula is unknown,
106 various theories have been postulated. The most accepted theory is interposition of
107 the colon between the anterior abdominal wall and the stomach at the time of
108 insertion of PEG tube [4]. As a result, the tube inadvertently passes through the
109 colon into stomach. Adhesions from previous operations and excessive air
110 insufflation into the stomach to facilitate trans illumination, especially in children,
111 predispose to colonic interposition. Despite misplacement of the PEG tube, it may
112 function normally unless excessive traction on the tube causes it to migrate from the
113 stomach to the colon. If a PEG tube needs to be exchanged due to leaking, clogging
114 or dislodging, it is a possibility that the reinserted PEG tube is directed into the
115 transverse colon rather than the stomach. Based on the review of literature, most
116 cases of GCC fistula present after PEG replacement [5]. In our case, although the
117 mechanism of GCC fistula was due to misplaced PEG tube, there was no history of
118 recent PEG reinsertion.

119 The presentation of patients with GCC fistula is varied. However, the most common
120 symptom is profuse diarrhea with each tube feeding. Others present with fecal
121 content in the tube, feculent discharge around the tube, severe malnutrition despite
122 tube feedings. Some are found incidentally on imaging for other reasons. The time of
123 presentation of GCC fistula is usually days to weeks after PEG insertion. Some may
124 present after a few months, but rarely after eight months [6]. In our case the patient
125 presented with GCC fistula two years after the PEG insertion. There have been no
126 case reports of such a late presentation. Diagnosis of GCC fistula is based on
127 clinical and radiological suspicion. Initially gastrografen study via the PEG is

128 recommended to confirm the clinical finding. If the fistula is not visualized, then a
129 barium enema or a gastrografin enema can be used to visualize it because of
130 greater pressure generated by this procedure [7]. Barium enema is reported as the
131 test of choice for diagnosis [8]. However, despite using both fluoroscopy and barium
132 enema, we were not able to demonstrate the fistula in our patient. Abdominal CT
133 with intraluminal contrast was helpful in identifying the GCC fistula, which has not
134 been discussed in previous studies. Abdominal x-ray, EGD, colonoscopy is rarely
135 utilized to identify such type of fistula.

136 There is no general consensus in the management of GCC fistula. Various treatment
137 options have been suggested, ranging from conservative approach of PEG removal
138 and NG tube placement to surgical exploration [5]. In our case, we chose the surgical
139 approach by removing the PEG tube, excision of the GCC fistula and placement of a
140 new gastrostomy tube. As opposed to conservative management, the surgical
141 approach avoided further risk of GCC fistula formation with another PEG tube
142 placement later.

143 GCC fistula can be prevented by adhering to strict safety measures at the time of
144 PEG insertion.

145 Gastroenterologists and surgeons have to keep in mind the possibility of interposition
146 of colon between anterior abdominal wall and stomach. Precautions such as clear
147 visualization of trans illumination through the abdominal wall and imprint of finger
148 pressure at the site of insertion should be strictly observed. Avoid excess air
149 insufflation in the stomach during the procedure. If air is aspirated into the syringe
150 before needle tip is seen in the stomach, suspect colonic interposition [9]. A mature
151 fistulous tract usually develops approximately 2-4 weeks' after PEG placement. If
152 PEG tube gets dislodged early on, avoid blind reinsertion; however, blind reinsertion
153 can be performed if the PEG tract is matured [10].

154

155 **CONCLUSION**

156 GCC fistula is a rare complication of PEG tube placement that can present anytime
157 from the time of insertion. It usually occurs after PEG reinsertion in patients with a
158 previously misplaced G-tube. GCC fistula is suspected if there is profuse diarrhea
159 after each tube feed, feculent drainage through or around the gastrostomy tube.

160 Imaging studies such as PEG fluoroscopy, barium or gastrografen enema and CT
161 abdomen with intraluminal contrast helps to identify most cases of GCC fistula. This
162 complication can be managed conservatively by removal of the PEG tube or by
163 surgical excision, especially in patients with peritonitis. Adherence to safety
164 measures by the healthcare professionals at the time of PEG insertion helps in
165 preventing GCC fistula.

166

167 CONFLICT OF INTEREST

168 Authors declare no conflict of interest.

169

170 AUTHORS CONTRIBUTION

171

172 Srikanth Parsi

173 Group 1-Substantial contributions to conception and design, Acquisition of data,
174 Analysis and interpretation of data,

175 Group 2-Drafting the article

176

177 Gustavo Franco

178 Group 2-Revising it critically for important intellectual content

179

180 Viney Setya

181 Group 2-Revising it critically for important intellectual content,

182 Group 3-Final approval of the version to be published

183

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212 213 **FIGURE LEGENDS**

214
215 Figure 1: CT abdomen revealing Gastrocolocutaneous fistula

216
217 Figure 2: (A) - GCC fistula (B) - Stapling of Gastro colic fistula by GIA staples (C) -
218 Re inforcement of staple line and closure of anterior colonic opening

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221

222 **FIGURES**

223



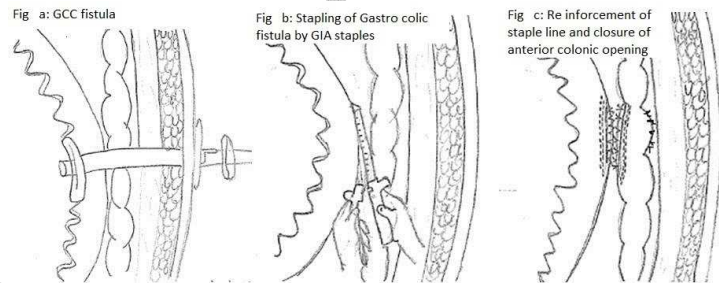
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